What is claimed is:

1. A process for fabricating a vacuum microelectromechanical device, comprising:

providing a structure comprising a plurality of structural regions and a plurality of sacrificial regions, wherein at least one of the plurality of structural regions comprises one or more flexural members;

treating the structure to remove the sacrificial regions, wherein the removal releases the structural regions such that the at least one of the plurality of structural regions is moved by a force exerted by the one or more flexural members or such that the at least one of the plurality of structural regions becomes capable of being moved about the one or more flexural members, and wherein the released structural regions provide at least a portion of one or more device components selected from the group consisting of a cathode structure, an input structure, an interaction structure, an output structure, and a collection structure.

2. The process of claim 1, wherein the structural regions comprise silicon, and wherein the sacrificial regions comprise phosphosilicate glass.

3. The process of claim 1, wherein the one or more flexural members comprise one or more hinge mechanisms.

4. The process of claim 1, wherein the step of providing the structure comprises steps of providing a silicon wafer, forming a silicon nitride layer, forming and patterning the plurality of structural regions, and forming and patterning the plurality of sacrificial regions.

5. The process of claim 1, wherein the one or more released structural regions comprise a cathode electrode and a grid.

6. The process of claim 5, wherein the cathode electrode comprises cathode flexural members and the grid comprises grid flexural members, and wherein the cathode flexural members and grid flexural members are attached to a device substrate.

7. The process of claim 1, further comprising the step of moving the at least one of the plurality of structural regions about the one or more flexural members.

8. A device comprising a vacuum microelectromechanical device that comprises:

a device substrate;

a cathode attached to the device substrate, the cathode comprising electron emitters;

a grid attached to the device substrate; and

an output structure,

wherein the cathode surface and the grid surface are substantially parallel, and wherein the cathode, the grid, or the cathode and the grid are attached to the device substrate by one or more flexural members.

9. The device of claim 8, wherein the cathode and the grid are attached to the device substrate by one or more flexural members.

10. The device of claim 8, wherein the cathode surface and the grid surface are substantially perpendicular to the device substrate surface

11. The device of claim 10, wherein the cathode and the grid are held in the substantially perpendicular position by locking mechanisms, the locking mechanisms attached to the device substrate by one or more flexural members.

12. The device of claim 8, wherein the output structure comprises an anode attached to the device substrate, wherein the anode surface is substantially parallel to the cathode surface and the grid surface.

13. The device of claim 12, wherein the anode is attached to the device substrate by one or more flexural members.

14. The device of claim 8, wherein the device further comprises one or more additional grids attached to the device substrate by one or more flexural members.

15. The device of claim 8, wherein the cathode comprises carbon nanotube emitters.

16. The device of claim 8, wherein the surfaces of the cathode and the grid are 10^6 μm^2 or less.

17. The device of claim 8, wherein the spacing between the cathode and the grid is less than 50 μm.

18. The device of claim 8, wherein the vacuum microelectromechanical device is a triode device, a tetrode device, a

pentode device, a klystrode device, a traveling wave tube device, or a klystron device.

19. The device of claim 8, wherein the device comprises a plurality of vacuum microelectromechanical devices, each of the plurality of vacuum microelectromechanical devices comprising:

a device substrate;

a cathode attached to the device substrate, the cathode comprising electron emitters;

a grid attached to the device substrate; and

an output structure,

wherein the cathode surface and the grid surface are substantially parallel, and wherein the cathode, the grid, or the cathode and the grid are attached to the device substrate by one or more flexural members.

20. The device of claim 19, wherein at least a portion of the plurality of vacuum microelectromechanical devices are interconnected to provide an integrated electronic circuit.

21. A process for fabricating a vacuum microelectromechanical device comprising:

providing a device substrate comprising a cathode electrode attached to the device substrate by one or more cathode flexural members, and a grid attached to the device substrate by one or more grid flexural members;

placing a mask over portions of the device substrate such that the cathode electrode surface is exposed;

forming electron emitters on the exposed cathode electrode surface to form a cathode;

removing the mask; and

moving the cathode about the one or more cathode flexural members and moving the grid about the one or more grid flexural members such that the cathode surface and the grid surface are substantially parallel.

22. The process of claim 21, wherein prior to the moving step the cathode electrode and the grid are substantially parallel to the surface of the device substrate, and wherein subsequent to the moving step the cathode electrode and the grid are substantially perpendicular to the device substrate surface.

23. The process of claim 21, wherein the provided device substrate further comprises a cathode locking mechanism and a grid locking mechanism attached to the device substrate by one or more locking flexural members, and wherein the process further comprises the step of securing the cathode and the grid in the substantially parallel relationship by moving the cathode locking mechanism into contact with the cathode and by moving the grid locking mechanism into contact with the grid.

24. The process of claim 23, wherein the one or more cathode flexural members comprise one or more hinges, wherein the one or more grid flexural members comprise one or more hinges, and wherein the one or more locking flexural members comprise one or more hinges

25. The process of claim 21, wherein the mask is attached to the device substrate by a flexural member.

26. The process of claim 21, wherein the provided substrate further comprises an anode attached to the device substrate by one or more flexural members, and wherein the process further comprises the step of moving the anode about the one or more flexural members such that the anode surface, the cathode surface, and the grid surface are substantially parallel.

27. The process of claim 21, wherein the step of forming electron emitters comprises forming carbon nanotubes on the cathode electrode surface.

28. The process of claim 27, wherein the step of forming electron emitters comprises:

forming a continuous or discontinuous catalyst layer on the cathode electrode surface; and

forming the carbon nanotubes on the catalyst layer by a chemical vapor deposition technique.

29. The process of claim 28, wherein the chemical vapor deposition technique is microwave plasma enhanced chemical vapor deposition.

30. The process of claim 27, wherein the step of forming electron emitters comprises:

spraying a mixture of the carbon nanotubes and a solvent onto the cathode electrode surface, and

performing an anneal.

31. The process of claim 21, wherein the step of providing the device substrate comprises steps of providing a silicon wafer, forming a silicon nitride layer, forming and patterning a plurality of silicon regions, forming and patterning a plurality of sacrificial regions, and treating the device substrate to remove the plurality of sacrificial regions.

32. The process of claim 21, wherein the surfaces of the cathode and the grid are 10^6 μm^2 or less.

33. The process of claim 21, wherein, after the moving step, the spacing between the cathode and the grid is less than 50 μm.

34. A process for fabricating a plurality of vacuum microelectromechanical devices, comprising:

providing a device substrate comprising a plurality of cathode electrodes attached to the device substrate by one or more cathode flexural members, and a plurality of grids attached to the device substrate by one or more grid flexural members, each cathode electrode having an associated grid;

placing one or more masks over portions of the device substrate such that the cathode electrodes are exposed;

forming electron emitters on the exposed cathode electrodes to form a plurality of cathodes;

removing the one or more masks; and

moving each of the plurality of cathodes about the one or more cathode flexural members and moving each of the plurality of grids about the one or more grid flexural members such that the surface of each cathode and the surface of the associated grid are substantially parallel.

35. The process of claim 34, wherein at least a portion of the plurality of devices are interconnected to provide an integrated electronic circuit.

36. The process of claim 34, wherein the step of forming electron emitters comprises forming carbon nanotubes on the cathode electrode surface.

37. The process of claim 36, wherein the step of forming electron emitters comprises:

forming a continuous or discontinuous catalyst layer on the surfaces of the cathode electrodes; and

forming the carbon nanotubes on the catalyst layer by a chemical vapor deposition technique.

38. The process of claim 36, wherein the step of forming electron emitters comprises:

spraying a mixture of the carbon nanotubes and a solvent onto the surfaces of the cathode electrodes, and

performing an anneal.

39. The process of claim 34, wherein the surfaces of the plurality of cathodes and the plurality of grids are 10^6 μm^2 or less.

40. The process of claim 34, wherein, after the moving step, the spacing between each of the plurality of cathodes and each associated grid is less than 50 μm.